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THESIS

MILITARY SERVICE AND MILITARY VOCATIONAL TRAINING EFFECTS ON POST-SERVICE EARNINGS

by

Phil Warren Bolin

June 1980

Thesis Advisor: Roger D. Little

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The influence of military service and military vocational training on post-service earnings was analyzed using the National Longitudinal Survey of young men (14-24 years of age in 1966). When individuals were classified by their propensity to use training neither military service nor military vocational training was a significant determinant of post-service earnings. A disaggregation of the sample by IQ revealed that military service

may be a proxy for ability level rather than a positive determinant of post-service earnings. Veterans who did not qualify for vocational training appear to suffer a post-service wage loss due to foregone civilian job tenure which is relatively important to individuals who do not take vocational training.

The survey was conducted from 1966 to 1973. During this time the U.S. economy was expanding. Increasingly over the period of the survey a larger percentage of higher educated individuals were choosing to enter the labor market without prior vocational training. This suggests that good employment prospects successfully tempted individuals to forego vocational training and enter the labor market directly. This indicates the importance of current wage levels to an individual's decision regarding training and employment.

Recommendations include changes to the military recruiting procedure that may increase recruiting efficiency. The recommendations are based on the observed behavior of individuals regarding their propensity to use vocational training. Although the value of military vocational training is questionable, the positive earnings influence of civilian vocational training can be demonstrated convincingly. Thus a benefit package that provided civilian vocational training for military service might increase enlistments if this benefit package were properly advertised. Another group of potential enlistees are those who do not have a propensity to use vocational training. These individuals place more value on current wages than future benefits from a current investment in vocational training. Changing advertising to more fully explain military renumeration may help increase volunteers from the group of individuals who do not have a propensity to use vocational training.

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Military Service and Military Vocational Training Effects on Post-Service Earnings

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Submitted in Partial Fulfillment of the
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The influence of military service and military vocational training on post-service earnings was analyzed using the National Longitudinal Survey of young men (14-24 years of age in 1966). When individuals were classified by their propensity to use training neither military service nor military vocational training was a significant determinant of post-service earnings. A disaggregation of the sample IQ revealed that military service may be a proxy for ability level rather than a positive determinant of post-service earnings. Veterans who did not qualify for vocational training appear to suffer a post-service wage loss due to foregone civilian job tenure which is relatively important to individuals who do not take vocational training.

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INTRODUCTION

PROBLEM

The All Voluntary Force (AVF) has increased the visibility of the true cost of military manpower. Military Manpower is no longer inexpensive and it is becoming a more significant portion of the total military budget. This change has brought about increased interest in military manpower, causing research into many aspects of the manpower issue.

One aspect of military manpower research which recently has drawn attention is the possibility that military service or military vocational training enhances the veterans post-service earnings, at least for some group of recruits. If a military tour or military vocational training is economically rewarding this knowledge can be used to attract potential enlistees in much the same way as a college education or civilian vocational training attracts individuals. If there is no economic benefit then other areas such as wages or post-service benefits must be given more weight in recruiting enlistees.

The benefits to post-service earnings of a military tour are extremely difficult to assess. The most reliable research design to answer this question would involve random assignment of individuals to the military. Understandably this procedure cannot be used. A second method, that of comparing wages before and after a military tour, is

generally not possible because most individuals do not have an earnings history prior to entering the service.

Even with these complications the question needs an answer. Therefore researchers have designed studies to provide possible answers. Realizing the complications involved, it is not surprising that different conclusions have been reached. Until 1973 studies concerning prior military service and civilian wages generally concluded that prior military service did not have a positive impact on later civilian earnings (Cutright, 1974). Starting in 1973, studies began to claim that military service and military vocational training had a positive impact on post-service earnings (Browning and Lopreato, 1973: De Tray, 1980: Fredland and Little, 1980: Little and Fredland, 1979: Lopreato and Poston, 1977: Norrblum, 1976: O'Neill, Ross, and Warner, 1979) One recent study (Trost and Warner, 1979) concluded that military vocational training had no positive impact on post-service earnings. The question of whether or not military service or military vocational training offers advantages in post-service earning is not completely resolved.

PURPOSE

This study is an analysis of the economic benefits of military service and military vocational training. Human Capital Theory, the basic methodology for the study, is

briefly reviewed. Then the major studies concerning the post-service economic benefits to a military tour are described and reviewed. From this review of over 20 studies it was concluded that a different approach to the problem would assist in determining whether there were economic benefits associated with a tour in the military. The new approach groups individuals based on their propensity to use vocational training. Two sections of this study concerned the propensity of veterans and non-veterans to use vocational training. A later section of this study investigated the possibility that military service, as a variable in regression analysis, is a proxy for an individual's ability level. Also examined was the hypothesis that the value of vocational training, no matter how obtained, decays with time.

SCOPE

It is important to clarify the scope of this study. Some past studies have dealt with veteran status across a mixed (veteran and non-veteran) sample. Others have dealt exclusively with veterans and compared veterans who use their military training to those who do not. This study analyzed subgroups of the veteran population and compared these subgroups with their appropriate non-veteran counterparts. Therefore, although the study's main purpose was to analyze the benefit from use of military vocational training in the immediate post-service years, the report

could not help but draw conclusions concerning the earnings contribution of military service in and of itself.

This study investigated the hypothesis that military service or military vocational training provides a net economic advantage in the immediate post-service years. For military service or military vocational training to be a source of human capital formation, the military must offer the individual a net positive gain over other activities he could choose. The economic question concerning benefits of military service must center on one issue. The issue is whether, among equally able individuals, a military tour or military vocational training offers a net economic advantage over other activities an individual could persue.

PRELIMINARY CONCEPTS

Two important concepts which vary in their operational definitions among different research efforts in this area are labor force and income. The labor force concept used here was that unemployed individuals who considered themselves job-seeking members of the labor force should be included in the analysis. The lack of human capital might be a cause of unemployment. Analysis using human capital theory must include the prospect of zero return. The income concept used here was reported annual wages. Hourly payrate can reflect seasonal employment patterns in addition to productivity and may not be a true indication of total dollars available to an individual each year. Since a human capital analysis is

concerned with total life-cycle earnings, annual wages appears to be a better income measure than hourly payrate. At times in this study hourly payrate is used as a measure of income for a comparitive analysis with annual wages.

SUMMARY

Conclusions

This study analyzed one sample of individuals with regard to their propensity to use vocational training. Another sample was then analyzed using a standard human capital theory approach which included disaggregating the sample by IQ. The analysis leads to the following conclusions.

1. When individuals are grouped according to propensity to use training, neither military service nor military vocational training can be shown to be a significant contributor to human capital formation during the first six years of civilian work experience. There is a first year earnings benefit from having taken military vocational benefit to the veteran who uses this training.

2. When individuals are grouped according to IQ levels neither military service nor military vocational training can be shown to be a significant contributor to human capital formation.

3. During an expanding economy more highly educated individuals bypass vocational training in order to start work.

4. Individuals who are at the bottom of the military employment ladder (non-takers of military training) may suffer a post-service wage loss due to military service.

5. Vocational training within the military is just another source of training that individuals may choose. It has little significance in post-service earnings probably because the value of military vocational training decays quite quickly or is only partially transferred.

Recommendations

Based on the above conclusions, several implications to policy decisions are apparent.

1. If military service is not providing an earnings premium, either in and of itself or due to vocational training, wages paid to military members are more important in obtaining sufficient manpower supply than might have been thought.

2. A shift in the recruitment theme that clearly spells out current military benefits may attract individuals who have a low internal rate of time preference for future earnings but are otherwise qualified for military service. Current recruitment themes do not effectively appeal to these individuals, and the current military wages are partially "hidden" in various allotments and benefits.

3. A benefit package that included post-service civilian vocational training may be effective in attracting individuals who have propensity to use training. Civilian training is of sound financial benefit to the individual and this benefit could be easily demonstrated to potential enlistees. Although some GI benefits can now be used for civilian vocational training, advertising, which makes this connection apparent to young men has not been persued.

4. Programs designed to help disadvantaged youth by sending them into the military are probably not in the best interests of the individual.

HUMAN CAPITAL THEORY

Human capital theory is the study of earnings distributions. It attempts to explain earnings paths by the acquisition of education and skills which enhance productivity. Bellante and Jackson (1979) suggests that an investment in vocational training effects an individuals productivity and thus the decision to invest in training can be analyzed by Human Capital Theory.

Bellante et. al (1979) explain that the decision to invest in training and/or education is like any other type of investment decision. Individuals have different internal rates of time preference for future earnings. Individual "A" may have a lower internal rate of time preference for future earnings than individual "B". These individuals would make different investment decisions regarding training if other considerations were equal. Individual "A" would require less return over costs to spend time or money in educational investments. For example, as earnings rise in occupation X which requires 4 years of education, individual "A" would be the first to invest time and money in the education. But if wages in occupation X continued to increase, individual "B" will eventaully invest in the education (other things being equal). This is true because at some point the increased wage from occupation X would provide individual "B" with the necessary return to invest in training.

Consider the above theory in relation to military service or military vocational training. If military vocational training provides a financial return, as is generally true of general education, military planners would have a strong selling point when promoting the military. If some alternative, such as civilian vocational training, provided a higher return in future earnings military planners would have to compete with that alternative for available manpower.

A major problem in analyzing and comparing military training with other training is the opportunity costs associated with the different alternatives. Additionally civilian training involves financial costs while the military pays an individual during the training period. The net effects of these costs and benefits depend on individual circumstances and must be weighed when considering the conclusions drawn in any study.

Having the facts about the relationship between military service and military vocational training will help ensure that wise military personnel policy decisions are made. The importance of this point is best demonstrated by reviewing a policy decision that had tremendous impact on the services and was based on an assumption about the benefits of military service. Cutright (1974) reports that the assumption that military service would benefit individuals was the driving force behind the conception of Pentagon Project 100,000. If project 100,000 did not help the individuals it was inappropriate policy; but, if there was a benefit, the question becomes

one of whether the military should be a socialization center for young Americans. This latter question is outside the scope of this paper, but the underlying question of whether military service and its associated vocational training benefits individuals is the very essence of such an argument and is within the scope of this paper. It is therefore important to know the effects of military service on post-service earnings.

REVIEW OF PAST STUDIES

OVERVIEW

This section is subdivided into three parts. First is a review of the pre-1973 studies which generally claim no earnings premium to military service. Second is a review of the post-1973 studies which claim an earnings premium for veterans. The third part analyzes the differences in these studies, as a group, and explores issues which require additional attention to validate research in the area of the effects of military service on earnings. This analysis is then used to develop the rationale, methodology, and design for this study.

PRE-1973 STUDIES

Cutright (1974) states that studies analyzing veteran status as a variable in life-cycle earnings had not been undertaken until the mid-1960's. Among the first studies in this area were those conducted by Oi (1967) and Miller and Tollison (1971). These studies discuss the conscription tax which imposes an opportunity cost on draftees. The studies were not based on direct measures of post-service earnings differences were measured only while the individuals were in the service. Understandably, given military pay scales in a draft era , these studies reported military service was a detriment to the earnings of an individual.

During the early 1970's Cutright (1974) reports that theoretical arguments were presented, hypothesizing that post-service earnings would probably be less for veterans than non-veterans because the civilian life cycle earnings program or plan was interrupted by the military tour. During the late 1960's and early 1970's several studies were conducted which accepted this hypothesis, but these studies were not based on large samples. Their results were generally unpublished and at times poorly reported (Cutright, 1974).

Using 1964 earnings data Mason (Cutright, 1974) conducted an analysis on post-service wage comparisons of a group of men aged 18 to 24. He standardized the wages of veterans and non-veterans for age and education and reported no significant difference in civilian wages between veterans and non-veterans. In a later analysis, Mason (Cutright, 1974) found that only a small group with commissioned service had higher earnings than the bulk of non-veterans.

Cutright (1974) conducted a study of 6,485 males (1254 were black) randomly selected from the Selective Service records in 1953. He used 1964 civilian earnings reported to the Social Security System in his analysis. The individuals selected were born between 1927-1934 and most of the veteran group served during the Korean War. Although is is not stated by Cutright (1974), inference from the information he provides indicated that the veterans in his sample had from 8-15 years

experience in the civilian labor force at the time of the study.

Specifically excluded from Cutright's (1974) study were service volunteers. The comparisons concern only true draftees and non-veterans. The non-veteran group had been given an induction exam, an AFQT test, and were either granted a deferment or were disqualified. The analysis compared wages of veterans and non-veterans after they had been grouped according to AFQT scores. The AFQT has been highly correlated with IQ and has been used as a psuedo-ability measure (Norrblum, 1976).

Cutright (1974) correctly pointed out that in absence of experimental controls to randomly assign individuals to the service, there is a hazard in comparing wages to estimate the effect of military service. It would be better to compare earnings of each group before and after the veteran's service. This has been difficult to do with available data, and more importantly, veterans usually do not have an earnings history prior to their military tour.

The hazard Cutright (1974) referred to was supported when it was discovered that one more year of education yielded different regression coefficients within each AFQT group. This difference indicated that individuals with different AFQT scores made different use of at least one variable; education. Basis on Cutright's (1974) study, including an ability measure in a regression analysis would probably provide more accurate results.

Cutright (1974) concluded that, for a substantial segment of the population, the net effect of a military tour on civilian earnings was negative. He pointed out that this conclusion depends on the assumption that there are no other discriminating variables that make the two groups different.

POST-1973 STUDIES

There are basically two groups of studies in the post-1973 period. One group viewed military service as a general training variable. The other group studied the effects of specific training an individual receives in the military. This later group of studies used samples that, for the most part, included only veterans.

Military Service as General Training

One of the first studies in the post-1973 time frame was conducted by Browning et al (1973). They reported an earnings premium due to military service. The veterans in this sample included individuals who had served during the 1960's. Cutright (1974) critiqued the study and was skeptical of the results because the study's design did not control for age.

A 1977 study (Lopreato et al, 1977) that compared the earnings of black veterans and black non-veterans concluded that blacks may receive an advantage from a military tour. Their conclusion was based on the observation that veterans seemed to earn more from an additional year of school than

non-veterans. They pointed out that this conclusion did not hold true when the sample was disaggregated by age and region of residence. Because of lack of data, the study did not control for other personal characteristic differences such as family background or IQ. They mentioned that a similar study, in progress, which used personal characteristic information, was initially indicating that veterans and non-veterans had similar backgrounds and IQs.

Little et al (1979) studied the long term effects of veteran status on earnings. The data for this study came from the National Longitudinal Survey of Men (45-59) in 1966 which was collected by the Department of Labor. Their analysis used earnings of individuals approximately 20 years after the individuals' period of service. They concluded that as a result of military service both whites and blacks benefited substantially in terms of long run earnings. Although it was not possible to determine if there were in fact life-cycle benefits to veterans, since only 1966 earnings were studied, the size of the 1966 earnings premiums suggested that there could be.

Knapp (1979) conducted a study of the impact of military experience on post-service earnings. The data for Knapp's study came from a 1964 cross-section survey of 3,045 veterans and 6,548 non-veterans. The veterans in this sample had indicated that they were service volunteers and not draftees. He concluded that enlistment is a statistically significant determinant of earnings. Additionally, his

results showed that the profitability of enlistment as a human capital investment declined uniformly as education increased.

Military Training as a Specific Training Variable

The second group of studies investigated the value of training received in the military.

O'Neill et al (1979) focused on the effects of military training and GI bill training on post-service earnings capacity. Data from the Department of Defense, the Veterans Administration, and the Social Security Administration were merged to form a sample of 70,000 men who were separated from active duty in FY 69. The portion of their study of interest here is their analysis of military vocational training as a significant determinant of post-service earnings. The study concluded that for particular occupations the individual who used his military training in subsequent civilian employment gained a wage advantage over those individuals who did not. This wage advantage held for occupations such as electronics repair, communications, and administration, but not for others. The authors argue that the decision to use military training in the civilian sector and the payoff in doing so, is clearly related to specific occupations. This last study seemed to support the proposition that military training is specific training and is not of benefit unless used in subsequent civilian employment.

Norrblum (1976) and Massell and Nelson (1974) conducted similar studies. Norrblum concluded that formal military vocational training had significant upward impact on wages if the individual entered a related civilian occupation. This study used wages one year after the veterans discharge from the service. Norrblum found that on-the-job training did not seem to have an impact even if an individual went into a related occupation. Further, these conclusions did not necessarily imply a net advantage to veterans since the study included only veterans. The Massell et al (1974) study, although indicating similar results, was questioned by the authors themselves because of a possible selection bias. They believed a possible bias might be entering the analysis because some individuals chose to use their training and others did not. Their study ended with a proposal of a methodology to control for selection bias.

A study by Trost and Warner (1979) analyzed a sample of veterans during their first year of civilian work to determine if military vocational training was responsible for earnings premium. They controlled for selection bias because they believed, as Massell et al (1974), that selection bias can lead to incorrect conclusions drawn from a study involving use of training. They found military training was not responsible for a wage premium. It appeared that those individuals who did not have military training received the necessary skills in some other way.

They do suggest that those individuals who do not get training in any other way could benefit from military training. That is, if an individual could not get vocational training otherwise and was given the opportunity to obtain vocational training in the military, he might receive an earnings premium from that training.

Fredland et al (1980) studied the military training variable across a sample of veterans and non-veterans. The veterans in the sample had been out of the military 20 years. The study concluded military training was beneficial if it was used. This study used regression analysis with a dummy variable to capture the significance of military training. Of interest is the fact that military service by itself was not statistically significant as an explanatory variable of earnings.

ANALYSIS OF STUDIES

In reviewing these studies as a group to determine the validity of the conclusion that an earnings premium is correctly attributable to some aspect of military service, several problem areas can be identified. These problems are addressed in this study's research design.

First, there is a question of whether the earnings premiums indicated in some studies may have arisen due to a military tour, of and by itself, or because of military training. Of the two groups of studies in the post-1973

time frame, the first group analyzed military service in and of itself without considering use of military vocational training, while the second group analyzed military training. Only one of the latter studies sampled non-veterans. In that study, military service as a dependent variable was not statistically significant as a determinant of earnings. One of the studies that analyzed military service in and of itself controlled for military training by excluding users of military training at one point in the analysis (Little et al, 1979). Since only one of these studies fully analyzed wage differentials existing between veterans who used military training, veterans who did not use training, and non-veterans it would seem beneficial and instructive to study this question further.

Second, the studies all used different explanatory variables. As mentioned earlier, most of the pre-1973 studies used some measure of IQ or ability while later studies did not. Even in studies that claimed a wage premium for veterans different variables were used. Table I presents a sample of some of the variables used in the studies. The use of different explanatory variables leads to the possibility of confounding results. Griliches (1977) reports that normal analysis procedures that leave out a discriminating variable can invalidate or confound research results. Thus, as can be seen by reviewing the different variables in past studies, it is possible to hypothesize that in some studies an

unaccounted for variable could be influencing the results. Additionally, there is at least one factor that none of the studies use which may also be confounding the results. Sanchez (1971) reported that there were many government programs begun during the late 1960's and early 1970's that were aimed at helping veterans gain employment. None of the studies conducted during this time frame, and reviewed above, took this possibility into account. It is interesting to note that some of these programs were the results of research that claimed veterans were disadvantaged. Since only veterans had access to these programs, the programs, instead of military service, might have had an influence on earnings. Since a variable to analyze this possibility was not included in the analysis, the effect of such programs would have been paritally represented by the military service variable.

A third issue concerning an analysis of these studies is that of selectivity bias. Selectivity bias can be encountered in one of several ways. As mentioned by Cutright (1974), individuals with higher ability levels could be entering the service. This implies different IQ distributions among veterans and non-veterans. Or, as described by several authors (Trost et al, 1979): Norrblum, 1976: Massell et al, 1974), a selection bias can be encountered because some veterans choose to work in jobs related to

Table I Variables Used In Past Studies

VARIABLES	STUDIES							
	Norrblum 1976	Massel et al 1974	Trost et al 1979	O'Neil et al 1979	Knapp 1979	Lopreato et al 1977	LIttle et al 1979	Cutright 1974
Age	X	X				X	X	X
Education	X	X	X	X	X	X	X	X
AFQT	X	X	X	X				X
Married or Dependents	X	X		X				
Residence	X				X	X	X	X
Comparison of Civilian Job	X	X		X				
Military Service vs no military					X	X	X	X
Race	X	X	X	X	X	X	X	X
Military Paygrade				X				
Use Military Training	X		X				X	
Duncan Index							X	
Tenure							X	
Job-Specific Variables							X	

Notes: The variables were either controlled for in the design or by selection of a sample with certain characteristics.

training while others do not, and in the occupational assignment process new entrants are assigned occupations on the basis of their educational background. These factors may influence earnings patterns and have no relationship to influencing factors from military service.

If not controlled for, these selection decisions can possibly confound research results. The selectivity issue appropriately concerns the research design as well as the actual variables used. If random assignment of individuals was used in the research design this issue would be easily controlled but without random assignment the issue cannot be ignored. Few of the post-1973 studies were able to look at the selectivity issue because of data restrictions.

Cutright (1974) attempted to control for possible entry selection bias by grouping individuals by AFQT scores prior to any regression analysis; but, few of the later studies, claiming a premium for military service across a veteran/non-veteran sample, controlled for this factor. Additionally, few of these later studies reported use of any of the validation techniques available to check for this possible problem.

That a possible selection bias might be effecting research results is evident in several studies. Cutright (1974) showed that among different AFQT levels one more year's education had differing effects on earings. Lopreato et al (1977) indicated that among their sample of blacks, veterans gained more benefit from an additional year of education. Their

research did not support the hypothesis that military service was responsible. Some studies that analyzed military training among veterans (Norrblum, 1976; Massell et al, 1974) reported the possibility existed that "more able" individuals were selected for training, and, thus the fact that they were "more able" was responsible for the wage premium, and not military training. An underlying assumption in this argument appears to be that "more able" individuals would get the needed training in some other manner if not from the military. In other words the argument claims training is beneficial, but that among equally able individuals training will be obtained one way or the other. The means that present value calculations to determine the most beneficial training investment should include the opportunity costs of lost civilian job experience, monetary cost of civilian vocational training, and the monetary wages received in the military in addition to future earnings. Realistically, non-monetary cost of military and civilian employment would have to be considered also.

A fourth possible problem area is that none of the studies replicated other studies. Nie, Hull, Jenkins, Steinbrenner and Bent (1975) report that sometimes unaccounted-for-factors which invalidate initial results are discovered when an identical study is replicated on different samples. This discovery is brought to light when identical designs produce conflicting results on different samples. In the social sciences it is difficult to identify all possible factors influencing a given

question, so the replication of identical research designs is important. For example, education as a factor in determining earnings is widely accepted because it has been proven time and time again to be a discriminating factor on a variety of differing samples. This replication process also can identify possible problems with sampling techniques which are vital to valid research (Hicks, 1973).

Importance of Issues

First, the replication of designs seems very important. Replicating designs on different samples would help eliminate some of the issues raised above and would increase confidence in a claim that military service is or is not a significant variable in explaining civilian earnings.

Second, of the studies that analyzed veterans and their use of training only one report controlled for selection bias. This was the only study that concluded veteran training had no positive economic impact on post-service earnings (Trost et al, 1979). Thus there needs to be further analysis of this issue.

Third, the majority of the studies analyzing the economic benefits of military vocational training were not able to identify net effects to such training because the samples did not include non-veterans. Some of the studies concluded that veterans who used their military training in civilian life earned a wage premium over the veterans who did not but since non-veterans were not included in the sample it could not be determined if this premium existed over comparable non-veterans.

Fourth, of the studies that found a military tour rewarding, the one which included a measure of ability (AFQT score) was the only one to conclude that being a veteran was not a signficiant positive variable in explaining earnings. (Cutright, 1974). Griliches (1977) points out that ability is hard to measure and care should be taken in adding variables indiscriminately to capture ability, but evidence from Cutright's (1974) study indicated that AFQT score seemed to capture a portion of an individual's ability. He discovered that individuals with different AFQT scores achieved different earnings with similar educational experience. Griliches (1977) states that ability is possibly related to family background characteristics. The Little et al (1979) study, which concluded veterans earned a wage premium, found that the veterans in their sample came from generally better backgrounds. The background variable was not included in their regressions. These points indicate that the possible issue of differing abilities among veterans and non-veterans needs increased emphasis.

Summary

In the review of the studies concerning military service effects on post-service earnings several issues were explored which influenced this study's design. These issues and their treatment are briefly summarized here. To address the issue concerning the relative benefits of military vocational training and a military tour without training one sample in the study was disaggregated by behavior regarding training. To address the issue of confounding results due to

use of different discriminating variables all variables used in past studies were included in this study. The issue of selectivity bias is accounted for in two ways. The IQ of each individual is used as an independent variable in all analyses to control for ability, and individuals are grouped according to their propensity to use training. Grouping individuals by their propensity to use training identified those people that, over time, will make certain decisions regarding the use of vocational training.

Although an unconventional approach the analysis reveals some interesting information about groups of individuals when classified by their propensity to use vocational training. These facts are presented in the following sections. The final issue concerned replicating past studies and, this issue is addressed in this study. Although past studies were not replicated exactly longitudinal information extends Norrblum's (1976) and O'Niell's et al, (1979) studies.

COMPARISON OF INDIVIDUALS BY PROPENSITY TO USE VOCATIONAL TRAINING

SAMPLE AND METHODOLOGY

A subset of the National Longitudinal Survey (NLS) of young men (14-24) in 1966 were grouped by their behavior regarding various vocational training opportunities. These groups are called training groups throughout this report when necessary for clarification. These training groups were used to analyze earnings benefits that might accrue to military service or military vocational training.

The U. S. Department of Labor contracted with Ohio State University for the NLS Survey which followed 5225 young men, 14-24 , from 1966 to 1973. Over 4326 variables on the labor market experience and behavior of these young men were collected. A wide variety of characteristics including personal information, family background information, work-force experience, education and training, and military experience were obtained. The cases included in the sample were obtained by a national probability sample of the civilian non-institutional population of males who, in April, 1966, were 14 to 24 years of age. The sample was drawn by the Bureau of Census from households in the 235 areas that constituted the primary sampling units in the Monthly Labor Survey.

In reporting data or conducting analysis, cases for which relevant information is not available are not included in the

analysis. This amounts to assuming that those men who did not respond do not differ significantly from those who did. The U.S. Department of Labor (1970) believes this to be a reasonably safe assumption for most variables since the number of no responses is quite small (e.g. less than 10 percent in all but a few variables).

To conduct this analysis it was necessary to define several traning groups. Six groups were defined as follows:

MIL USER. These were individuals who had complete military service, received vocational training while in the military, and reported in the NLS study that they used their military training on their civilian job for at least one year from the time of their discharge to the end of the study. (NOTE: All military control groups include members who served at least six months in the military.)

MIL NON-USER. These were individuals who had completed military service, received training while in the military, and reported in the NLS study that they never once used their military training on a civilian job during the time of the study.

MIL NON-TAKER. These were individuals who had served in the military and reported in the NLS study that they did not receive any military training beyond basic entry training.

NONMIL USER. These were individuals who had never served in the military prior to the end of the study but reported that they completed some civilian vocational training which they

later used in a job for at least one year during the course of the NLS study.

NONMIL NON-USER. These were individuals who had never served in the military prior to the end of the study and although they had completed some civilian vocational training, they had never used this training on a later civilian job.

NONMIL NON-TAKER. These were individuals who had never served in the military prior to the end of the study and never completed any civilian vocational training.

Several comments are important concerning these categories. First, whether an individual was a user, non-user, or non-taker of military or civilian training was determined from the individual's response to the survey questionnaire, and not from a comparison of his occupation with type of training received. The survey provided broad category training codes which could be compared with a one-digit occupational index (i.e. profession-technical, managerial, clerical-sales, etc.), but this was believed to be less reliable than the individual's response to the survey question on use of training. To investigate the difference between the comparison technique and the individual's response a USE TRAINING variable was developed by comparing one-digit training and one-digit occupational codes. In each of the six years of the study the results were almost identical. The constructed variable identified approximately 50 percent more users than indicated by the responses to the survey question. Only one per-cent

of the individuals who said they were users of training were identified as non-users by the constructed variables. In other words, 66 percent of the users identified by the constructed variable in fact said they used their vocational training, whereas 34 percent said they did not. If three-digit training and occupational codes were available this difference could probably be reduced. Throughout this study the stated use or non-use of training was used instead of the constructed variable.

Second, training refers to vocational training. In the military subgroups this means training in addition to basic recruit training. Third, during the remainder of this report the captialized short titles will be used to reference the training groups. Fourth the suffixes USER, NON-USER, and NON-TAKER in the military subgroupings are in reference to military vocational training, whereas these suffixes in the non-military subgroups refer to civilian vocational training. Finally, the military group included only individuals who served more than six months in the service. Individuals who served less than six months were probably reservists or individuals who were discharged early and it was felt their motivation for service was different than regulars and thus might cloud the results.

Individuals who were not in the labor force during the years of the survey were not included in the sample for this study. Data was available on the year veterans were discharged

so the sample was subdivided into year groups to aid in analysis.

All military personnel discharged prior to the end of 1966 (the first year of the survey) were placed into one of three military groups (MIL USER), MIL NON-USER, and MIL NON-TAKER) and labeled year group 1966. To form a non-military 1966 year group individuals were selected who had never served in the military during the course of the NLS survey and had entered the work force prior to the end of 1966. These year group 1966 non-military individuals were then placed into the appropriate USER, NON-USER, and NON-TAKER subsets in accordance with the previous definitions. The 1967 through 1971 year groups were selected in a similar manner. The military year groups represent military individuals who were discharged during that year and the non-military year groups represent individuals who were entrants to the labor force for the first time that year.

A constructed variable was used to determine if the non-military individuals were in the labor force for the first time in a given year. The variable was used to determine if the individual considered himself a member of the full time labor force and worked more than 35 hours a week, or worked less than 35 hours a week during the survey week because he was on vacation, had just lost a job and was looking for work, or his normal full time work week was less than 35 hours.

The variable that determined if individuals were in the labor force was constructed for a dual purpose. First, it eliminated the younger portion of the sample who had yet to make the choice to serve or not to serve in the military. Second, all military members in a particular year group met the criterion of being in the labor force. In essence then, each year group of the sample represents the military and non-military individuals, drawn from a representative sample of the U.S., who entered the civilian labor force for the first time that year. There was one exception to this.

The exception concerns the 1966 year group. The NLS survey started in 1966. Some of this year group's members entered the labor force prior to 1966. The following facts about this 1966 year group indicated that the civilian work experience was similar across the training groups. In 1967, 90 percent of the 1966 year group responded to a question about how long they had been employed on their current job. The mean time was 1.5 years and a chi square test across the six training groups produced an insignificant F statistic of 1.54. Another variable available from the study was the year an individual started his first job. An analysis of this variable indicated that some military individuals included the military as a first job, while others did not. Additionally, some individuals reported starting their first job while still attending school indicating that this variable might not accurately represent full-time work experience in the civilian

labor market. But, even though it was not believed to be a good indicator of entrance to the labor force a comparison of this variable across the veteran and non-veteran sample in 1966 showed that the non-veterans have, on the average, only 10 months more work experience. Therefore, the analysis in this paper assumes individuals within a year group have similar civilian work force experience.

The sample drawn from the NLS using the definitions above consists of 2264 individuals.Five hundred fifty-two were in the military subgroups. The sample can be subdivided into 36 cells based on year group and training group status. Table II presents the sample broken down by these cells.

Five additional factors concerning the sample are important. First, the sample excludes time in the military from labor force experience. Some authors (Lopreato et al, 1977) have claimed that working in the military provides the veteran with and advantage in handling a civilian job. Since this study concerned, in part, the effects of a military tour, excluding time in the military from labor force experience will allow direct comparisons to be made regarding civilian job experience.

Second, within each year, individuals undoubtedly entered the civilian labor force at different times. Since it would have been impractical to control group entry in a narrower time window it was assumed that the time of entry is not significant. This possible problem was believed relatively unimportant since, in the year following entry, the individual

TABLE II Sample Composition Breakdown By Training Group and Year Group

ENTRY INTO LABOR FORCE	TRAINING GROUPS						
	MIL USER	MIL NON-USER	MIL NON-TAKER	NONMIL USER	NONMIL NON-USER	NONMIL NON-TAKER	ROW TOTAL
1966	61	220	33	436	153	651	1554
1967	1	2	3	86	17	70	179
1968	2	12	8	51	7	41	121
1969	11	45	20	49	10	49	184
1970	18	24	33	21	4	28	128
1971	16	14	29	4	6	29	98
Column Total	109	317	126	647	197	868	2264

was a potential member of the civilian labor force for the remainder of the survey.

Third, once an individual was added to the sample that individual stayed in the sample for the duration of the study. This was done to observe the behavior of the individual over time. Therefore, it is possible using this procedure for an individual to be added to the sample as part of year group 1968, subsequently stop work, and then reenter the job market. During this entire period he would be a part of the sample as a 1968 year group member.

Fourth, and important from an analytical point of view, the sample was constructed to observe individuals in their first years of civilian work experience. The year groups of the sample did not include individuals in different phases of the training and employment cycle but included individuals who had started their first year of employement. Since human capital theory concerns life-cycle earnings it was appropriate to construct the sample in this manner. Although total life-cycle earnings could not be analyzed, direct comparisons were possible for the first years of earnings. These comparisons concerned individuals who had made different pre-employment training investment decisions but were at the same point in their employment history.

A fifth important factor in this sample's construction concerns the definition of a user of vocational training. Training can be specific or general in nature. Specific

training increases an individual's productivity only in a specific employment, while general training supplies the individual with basic communication and quantitative skills and helps develop work discipline useful in any employment. In the real world a given vocational training program probably provides training that is somewhere on a continuum between specific and general training. After completing a training program it is easy to imagine an individual using his job-specific vocational skills on the next job. While employed in this job he learns more and, due in part to his previous vocational training, develops options for future employment. Even if future employment is not related to the job-specific skills obtained in vocational training it would be incorrect to say the individual did not, at least partially benefit from that training. Therefore, this section's analysis considered an individual a user of vocational training if he made use of the job-specific skills at least once during the survey period. From another point of view this defninition describes an individual who had a propensity to use vocational training. It is unimportant whether the reader considers the definition used here as descriptive of a real world user of propensity to use training. But it is important for the reader to keep in mind the criterion, outlined above, used to define a user of vocational training.

USE OF THE SAMPLE

Throughout this and the next section, two types of comparisons will generally be made. The first will be a comparison of year group 1966 and their labor market behavior and/or wages in 1966 compared to their behavior and/or wages in 1972. The second analysis will be to compare their labor market behavior and/or wages in 1966 for the 1966 year group, and then through the years, 1966 to 1972, add the succeeding year groups (1967 through 1971) as a comparison is made for selected years throughout the period. This analysis utilizes the longitudinal nature of the survey and will point out some employment trends in various subgroups of the population.

The training groups were defined to determine appropriate analysis and/or comparison techniques to answer the following question. What would be the economic status of the veteran if he had chosen not to go into the military?

CHARACTERISTICS OF INDIVIDUALS

This section presents an overview of the sample and presents some apparent trends. In analyzing trends it must be remembered that the observations presented concern members starting civilian work experience in the year-group referenced. The military groups represent individuals who were discharged in that particular year. They are not representative of a cohort of individuals who joined the service several years earlier. Some of the individuals

discharged had served two years while other had served four years. They are only discharged from the service that year. The non-military group members are representative of individuals who chose to begin full-time labor market activities that year.

Wages

Table III presents a breakdown of wages for the 1966 year group. The wage comparison showed that the MIL USER received the highest wage of any group during the first year of employment. The NONMIL User received the next highest average wage. The two non-taker groups received the lowest average wages.

A comparison of wages among the three military groups in 1966 indicates that a first year benefit accrued to the MIL USER over the MIL NON-USER. Similiar results were obtained by Norrblum (1976) and Massell et al (1974) when they studied first year earnings of a sample of veterans who had taken military vocational training.

Following this year group's wages through 1972 indicated that the relative positions did not change drastically. The Mil NON-USER improved his position in comparison to the MIL USER somewhat. In 1966 the MIL NON-USER's wages were 93 percent of the MIL USERS, while in 1972 his wages were 95 percent of the MIL USER'S. Further the two user groups were the top wage earners in all years and although the NONMIL USER earned slightly more in 1972 the wage difference between

these two groups was not significant at the .05 level. The two NON-USER groups as well as the two NON-TAKER groups retained the same relative standing with the NON-TAKER groups being the lowest wage earners throughout.

When successive year groups were added the comparison revealed different results. Table IV presents a breakdown of wages for the entire sample. In 1972 the NONMIL USER'S average wage of $10,828 was clearly the highest, followed by the MIL USER group with $9480. Later analysis will supply some rationale for this difference.

A factor that may have influenced wage differentials was the general attitude of the individuals. In the 1966 year group 67 percent of the MIL NON-TAKER's stated the military service either had no effect or hurt their civilian career. Of the MIL USER's and MIL NON-USER's only 23 percent and 49 percent, respectively responded that the military service had no effect or hurt their career. Additionally, 24 percent of the MIL NON-TAKERs were drafted as opposed to 9 percent for both the MIL USERs and MIL NON-USERS.

TABLE III Mean Wages For The 1966 Year Group*

Entry Into Labor Force	WAGES USED	Training Groups					
		MIL USER	MIL NON-USER	MIL TAKER	NONMIL USER	NONMIL NON-USER	NONMIL NON-TAKER
1966 (1121)**	1966	6081	5698	4184	5765	4552	4096
1968 (1130)	1968	7812	7018	5450	7460	6050	5413
1969 (1220)	1969	8709	7247	6398	8294	6321	5884
1970 (1315)	1970	8637	8242	6527	8829	6957	6293
1972 (1440)	1972	10865	10329	7483	10892	8113	7555

* A chi square test across control groups demonstrated a significant difference at <.01 level for each year group.

** Indicates the number of individuals in the sample. Each follow-on year group was added to the previous year.

TABLE IV Mean Wages For The Entire Sample

Entry Into Labor Force	WAGES USED	Training Groups					
		MIL USER	MIL NON USER	MIL NON TAKER	NONMIL USER	NONMIL NON-USER	NONMIL NON-TAKER
1966 (1440)**	1966	6081	5698	4184	5765	4552	4096
1968 (1494)**	1968	7668	6969	5437	7217	5938	5346
1969 (1590)**	1969	8318	7140	6637	8011	6205	5911
1970 (1705)**	1970	8156	7925	6166	8611	6757	6361
1972 (1796)**	1972	8995	9470	6390	10828	7810	7996

* A chi square test across training showed a significant difference at <.01 level for each year group.

** Indicates the number of individuals in the sample. Each follow on year group was added to the previous group.

IQ

A comparison of IQ's for the entire sample is presented in Table V. The average IQ for the two USER groups was higher than other groups. This higher IQ level may in part explain the higher wages these groups received. When the entire sample was compared with the 1966 year group the only difference noted was that the NONMIL NON-TAKERs from the entire sample had a higher average IQ level than the NONMIL NON-TAKERs from the 1966 year group (99.2 vs 94.4). This indicated that in each successive year individuals with higher IQ levels were joining the NONMIL NON-TAKER group. In other words, individuals with higher IQ's were joining the labor force without prior vocational training. A possible reason for this behavior may have been that an expanding economy, with relatively low unemployment, made it easier to obtain employment without previous training. Thus some individuals who might have qualified for training chose to go to work instead of taking training. This agrees with human capital theory which would predict increased work opportunities should draw individuals with a low internal rate of time preference for future earnings into the work environment without a prior investment in training.

Marital Status, Race, and Age

Table VI provides information on marital status, race, and age of the sample. The training groups with the highest percentage of married individuals were also among the highest

TABLE V Mean IQ Levels as of 1971 For Entire Sample

VARIABLE	TRAINING GROUPS					
	MIL USER	MIL NON-USER	MIL NON-TAKER	NONMIL USER	NONMIL NON-USER	NONMIL NON-TAKER
IQ MEAN	102	97.3	96.9	102.1	99.3	99.2
VALID CASES IN THE SAMPLE	84	245	84	508	118	492

wage earners. This agrees with studies by Norrblum (1976) and Massell et al (1974) that indicated that being married was a significant positive factor in determining wage variation.

Regarding race, it was noticed that non-whites were over represented in each of the two NON-TAKER categories; 42 percent of the MIL NON-TAKER group was non-white and 35 percent of the NONMIL NON-TAKER group was non-white, while the highest percentage of non-white in any other category was 28 percent. These percentages are higher than normal because the NLS over sampled non-whites to provide numbers large enough for studies on non-white populations. The high percentage of non-whites in the NON-TAKER categories is still important.

The relatively low age of the MIL NON-TAKER group warrants discussion. The reason might be attributable to the fact that MIL NON-TAKER's were individuals who spent less time in the service. This seems reasonable since a larger percentage were draftees and, since this group did not take military vocational training, their obilgated time would undoubtedly be less. But realizing that this group also had the highest percentage of non-whites, there is another possible explanation. These individuals, at an early state, might have seen the military as a better opportunity than work or future training. Since the non-white unemployment rate has always been higher than the white unemployment rate, this group may have been made up of individuals with few civilian alternatives.

TABLE VI Marital Status, Race, and Age
(percentage of sample)

VARIABLE	TRAINING GROUPS						
	MIL USER	MIL NON-USER	MIL NON-TAKER	NONMIL USER	NONMIL NON-USER	NONMIL NON-TAKER	TOTAL
Mean age in 1973	27.4	28.4	25.8	28.0	27.7	27.8	27.8
Marital Status 1966 (percentage)							
single	42.6	42.6	51.5	36.5	52.3	45.3	43.3
married	57.4	56.4	48.5	63.5	47.7	54.7	56.0
Marital Status 1973 (percentage)							
single	15.6	9.8	25.4	8.2	20.8	15.6	13.6
married	84.4	90.2	74.6	91.8	79.2	84.4	86.4
Race (percentage)							
white	39.9	85.5	57.9	82.8	71.6	65.3	74.5
other	10.1	14.5	52.1	17.2	28.4	34.7	25.5

Education

Educational attainment of the individuals is presented in Table VII. Of significance for the 1966 year group was the similar educational attainment of those individuals in the military and the wide disperity among the non-military groups. But when viewing the entire sample in 1973 it was noted that the average educational level was similar across groups. The increase in average education of the NONMIL NON-TAKER as successive year groups were added was similar to the increase in IQ level of this group which was noted earlier. Thus, more highly educated individuals were "joining" the NONMIL NON-TAKER group. This could be another indication that the expanding economy allowed an individual to obtain employment without vocational training.

Civilian Training

Although the non-military portion of this sample was subdivided on the basis of their having taken or used civilian training, it is instructive to look at the groups' (specifically the three military groups) behavior regarding civilian training. Table VIII presents such information. To compute percentages of takers and users of civilian training an individual was considered a user or taker if he either used or took civilian training for one year during the time period of the survey.

Table VIII shows the percentage of each group that took civilian training and the percentage of the group that used civilian training. Of the members of the MIL USER group

TABLE VII Education Attainment of Sample

VARIABLE	TRAINING GROUPS						
	MIL USER	MIL NON-USER	MIL NON-TAKER	NONMIL USER	NONMIL NON-USER	NONMIL NON-TAKER	TOTAL
1966 Year Group Grade Completed as of 1966	11.7	11.7	11.7	12.4	11.2	10.4	
1966 Year Group Grade Completed as of 1973	12.3	12.3	12.3	12.9	11.9	10.8	
Entire Sample Grade Completed as of 1973	12.7	12.4	12.5	13.7	12.1	12.0	
Increase in Education Attainment for 1966 Year Group from 1966 to 1973	.6	.6	.6	.5	.7	.4	
Increase in Education Attainment for entire sample from 1966 to 1973	1.0	.7	.8	1.3	.9	1.6	

29.5 percent took civilian vocational training and 19.7 percent used civilian vocational training in 1966. Among the military subgroups, the MIL USER group was the heaviest user of civilian training. If a veteran used his military vocational training this might have influenced him to take future civilian training. This appears possible because in the first years of work the MIL USER was receiving a wage advantage that may have been perceived as a benefit to vocational training. There was no clear indication that the military had an influence that caused this action. In fact the NONMIL USER is also a heavy user of vocational training after his first exposure to such training.

Although not shown in the table, a higher percentage of veterans than non-veterans used civilian vocational training. This is not surprising since the military entrance standards ensure that the majority of veterans have the ability to qualify for vocational courses and the military recruiting theme probably attracts individuals who have a desire to take vocational training. They also may be more certain of the type of training they want since the military has provided these veterans with a training experience prior to entering the civilian labor market.

Table IX and Table X provide additional information on use of civilian vocational training. The 1966 year group was asked in each of the six years of the survey whether they took civilian vocational training. Likewise, in each of the six years the individuals were asked if they used civilian training on the job that year.

TABLE VIII CIVILIAN TRAINING BEHAVIOR OF SAMPLE

VARIABLE	TRAINING GROUPS					
	MIL USER	MIL NON-USER	MIL NON-TAKER	NONMIL USER	NONMIL NON-USER	NONMIL NON-TAKER
1966 Year Group & Civilian Training in 1966						
TOOK	29.5	18.2	18.2	29.4	45.8	0
USED	19.7	5.9	9.1	20.2	0	0
1967 & Prior Year Group's Civilian Training in 1967						
TOOK	18.0	17.7	15.2	22.0	26.3	0
USED	18.0	12.3	12.1	22.0	0	0
1969 & Prior Year Group's Civilian Training in 1970						
TOOK	17.3	24.0	25.0	32.8	22.5	0
USED	12.0	17.2	18.8	38.6	0	0
1970 & Prior Year Group's Civilian Training in 1971						
TOOK	17.2	14.5	8.2	18.4	12.6	0
USED	21.5	15.15	7.2	34.1	0	0

Notes. A non-military user was defined as a non-veteran who used training sometine in the survey period. Therefore the NONMIL USER percentage for all of training is not 100 percent unless training over the entire survey period is considered.

TABLE IX Prior 1966 Year Group Taking Advantage of Civilian Training

VARIABLE	TRAINING GROUPS					
	MIL USER	MIL NON-USER	MIL NON-TAKER	NONMIL NON-TAKER	NONMIL NON-TAKER	TOTAL
Nr. Years Data Available (A)	6	6	6	6	6	6
Sample Size (B)	61	220	33	436	153	1554
Total Nr. Years Available to Take Training (A x B)	366	1320	198	2616	918	9324
Nr. Opportunities Used (C)	86	270	37	774	227	1394
Percent Useage (C ÷ (A x B))	23.5	20.5	18.7	29.6	24.7	14.9

TABLE X Year Group Use of Civilian Training

VARIABLES	TRAINING GROUPS						
	MIL USER	MIL NON-USER	MIL NON-TAKER	NONMIL USER	NONMIL NON-USER	NONMIL NON-TAKER	TOTAL
Nr. Years Data Available (a)	6	6	6	6	6	6	6
Sample Size (b)	61	220	33	436	153	651	1554
Total Nr. Man Years Available to Use (a x b)	366	1320	198	2616	918	3906	9324
Nr. Opportunities Used (c)	71	213	24	825	0	0	1133
Percent Useage (c ÷ (a x b))	19.4	16.1	12.1	31.5	0	0	12.2

Table IX shows that, among veterans, users of military training took the most advantage of civilian training, followed by non-users and non-takers. Having taken training may not cause an individual to take more training: some other unmeasured characteristics may be the cause. It appears likely that, if an individual has used training in the past, he will take more. Once an individual has used training he may realize that vocational training is at least one method of signaling a prospective employer of his increased productivity. From the data presented in Table X, it appeared that, for the military groups, those who at some time used military training were more apt to use the civilian training they received. A comparison of veterans and non-veterans regarding the data in Table IX and Table X indicated that a higher percentage of veterans took and used civilian vocational training. This observation was not surprising because military screening standards ensure a high percentage of military individuals are qualified for vocational training.

Summary

Analysis of the personal characteristics of the sample reinforce the opinion that within the military and non-military populations there were different subsets of individuals. The MIL USER group and NONMIL USER group tended: to be similar in IQ level, marital status and had the lowest percentage of non-whites. Additionally the two user categories were at the top of each subgrouping in educational attainment. Table XI presents this summary information.

TABLE XI Summary Data On Sample

VARIABLE	TRAINING GROUPS					
	MIL USER	MIL NON-USER	MIL NON-TAKER	NONMIL USER	NONMIL NON-USER	NONMIL NON-TAKER
MEAN IQ	102	97.3	96.9	102.1	99.3	97.2
Percent of prior 1966 Year Group Single in 1966	42	43	51	36	52	45
Percent of Sample Single in 1973	15.6	9.8	15.4	8.2	20.8	15.6
Percent of Sample Non-White in 1973	10	14	42	17	28	34
Grade Completed for 1966 Year Group as of 1973	12.3	12.3	12.3	13.9	11.9	10.8
Grade Completed for Entire Sample as of 1973	12.7	12.4	12.5	13.7	12.1	12.0

It is important to note that the NON-TAKER subsets made up a signficantly different proportion of the military and non-military subgroups; NON-TAKERs of military training made up only 23 percent of the military subgroup, whereas NON-TAKERS of civilian training made up 50 percent of the non-military subgroup. This is important because the general procedures used to analyze differences among groups, notably analysis of variance and multiple regression, are based on linear mathematical computations which cannot account for every conceivable interaction and variance among different groups. Thus, sample selection, or more importantly control groups selection, can influence the results. More specifically, an analysis of variance using the 1966 year group indicated different results depending on the groups chosen. An example will help demonstrate this point. For this example, wages earned in 1972 were used as the dependent variable. The following covariates were controlled for within the ANOVA design: Age, race, maritial status in 1971, grade of school completed in 1971, and IQ. If four groups were choosen (MIL USER, MIL NON-USER, MIL NON-TAKER, and all non-military) the yearly premium to the MIL USER was $1157 (adjusted for covariates). The non-military group suffered a $172 yearly deficit. When the six groups, defined earlier were used in an identical analysis the MIL USER premium was $1145, while the NONMIL USER group showed a premium of $687; of course the NONMIL NON-USER

and NON-TAKER groups showed a deficit due to group membership. In this example all covariates and the group categories indicated a significance of $< .05$. Depending on the selection of groups, one finds that the MIL USER in the 1966 year group received a premium of $1317 over non-veterans, or that the MIL USER received only a $458 premium over non-veterans with similiar IQ and family background characteristics. This example illustrates the importance of analyzing appropriate groups when studying the benefits of vocational training received in the military.

Most of the studies reviewed in Section III of this paper that concluded military service provided an earnings premium, compared veterans and non-veterans as two separate groups. The results of the above example demonstrate that this grouping may not be appropriate because the non-military population has a larger proportion of individuals who, for whatever reason, do not take training. They may not be a realistic group for comparison with veterans.

An additional factor that provides rationale for careful group selection when testing for any benefit accruing to veteran status is the selection process used for entrance into the military. From the entire non-military population, the military rejects lower mental groups and some non-high school graduates. These individuals are represented in the non-military population but not in the military population.

Therefore, it is approriate to delineate representative groups for comparison. Of course, using random assignment to various groups in a true experimental design would be preferable but as indicated by Cutright (1974), this has been impossible in real life.

One possible approach may provide information on the influence of military service and military vocational training on post-service earnings, in lieu of a random assignment research design, is to compare the personal characteristics of veterans and non-veterans who have similar propensities to use vocational training. If the individuals in the two user groups were found to be very similiar in personal characteristics, and their earnings were similiar it might indicate that military service had a negligible effect on post-service earnings. This rationale follows for the other two pairs of groups (NON-USERS and NON-TAKERS). Discriminant analysis was used to determine how different these various groups were in personal characteristics.

DISCRIMINANT ANALYSIS

Discriminant analysis, available through the Statistical Package for the Social Sciences (SPSS), was used to determine if the training groups could be clearly distinguished from one another. The discriminant procedure weights and linearly combines discriminating variables so that the groups are forced to be as statistically distinct as possible. The variables used in the analysis were selected to be as independent from

the influence of military service as possible. For example, the military has helped individuals obtain a high school diploma through the GED program, so grade completed was not a suitable discriminating variable. Some individuals would argue that the military and non-military segment of society have different hiring policies across race, so race was not considered as a discriminating variable. The variables that were chosen are defined as follows:

IQ. IQ score with 101.6 being the group mean.

ROTTER. Rotter score which represents the individuals internal or external control orientation. A person with an internal control orientation feels that misfortunes are the result of mistakes, that people who fail do not take advantage of opportunities, and that success is a matter of hard work. A person with an external control orientation feels that misfortunes are due to bad luck, that without breaks you cannot be an effective leader, and that a good job depends on being in the right place at the right time.

MARSTA. Marital status of the individual on a scale of 1 to 6. A value of one indicated an individual was married with spouse present while 6 represented a single individual. Two through 5 represented, married with spouse absent, separated, and divorced, respectively. This scale was used as a continuum indicating relative dependence of other people on the individual respondent.

SOCIO-ECON STATUS. This was a representation of the socio-economic status of the individuals family when the individual was 14 years of age.

HEALTH. A dummy variable was created. A value of one indicated that the individual had a health problem that affected his ability to work, to some degree.

AGE.

Table XII presents the results of the discriminant analysis. The table presents the mean for each variable across various groups, the discriminant function Eigenvalue and Wilks' Lambda value. The Eigenvalue denotes the ability of a function to separate the groups. (The value ranges form 0 to 1.0) A high value represents a strong discriminating function. The Wilks' Lambda is a representation of discriminating power. Therefore a lower value indicates more discriminating power. Based on the variable entered in the discriminant analysis, the procedure combines the variables in a mathematical form that forces the groups to be as statistically different as possible.

The results of the discriminant procedure lead to the following observations. First, the MIL USER and MIL NON-USER groups could not be distinguished. This made apparent sense as the military screening process would likely select similar individuals to take military training. Although the discriminant procedure developed a function between MIL USER and NON-MIL USER. The Wilks' Lambda score of .96 and the Eigenvalue

of .04 indicated there was really little difference between the groups. The NON-TAKER groups were likewise quite similar. But the difference among the two NON-USER groups was more signficicant, with a .76 Wilks' Lambda and a .32 Eigenvalue. This difference was not surprising because it is possible to take military training that does not transfer to a civilian occupational use but impossible to take civilian training that does not have a civilian occupational use. The MIL NON-USER could have been a non-user of training because his training was not transferable but there must be other reasons for a NONMIL NON-USER not to use the civilian training he received.

This analysis indicated that the MIL USER and MIL NON-USER were similar individuals and not unlike the NONMIL USER; individuals who get training and make use of it. Since these groups were similar in personal characteristics that are independent of military influence, it seems possible that these personal characteristics cause an individual to seek and use vocational training. This weakens the argument that military vocational training has an influence on post-service earnings. In fact this analysis strengthens the argument that the military is just one place to get vocational training. It must be kept in mind through that an individual who cannot afford civilian training may be able to obtain military training and benefit financially from that training in his civilian career.

Additionally, discriminant analysis indicated that the NON-TAKER groups were quite similar. Their very classification indicates they have a low time preference for future earnings. As noted earlier, there was some indication that the MIL NON-TAKERs may have had few civilian alternatives to a military tour. Also the mean wage level of the MIL NON-TAKER group did not indicate that a military tour benefited these individuals. For the 1966 year group, the MIL NON-TAKER made the least advance in earnings over the six year period (1966-1972). Their wage advance of $3299 was less than the NONMIL NON-TAKER wage advance of $3459, and less than an average increase of $4950 for the two user groups. This observation is even more significant because the non-taker of military vocational training took some civilian vocational training while the NONMIL NON-TAKER group, of course, did not.

TABLE XII Discriminant Analysis Results
1966 Year Group Only

GROUP IN DISCRIMINANT ANALYSIS	VARIABLES							
	IQ	ROTTER	MARSTA	SOCIO ECONOMIC STATUS	HLT	AGE	WILKS LAMDA	EIGEN-VALUE
MIL USER VS MIL NON USER	99.6 97.5	19.9 20.6	3.4 3.5	102.4 101.3	.11 .10	22.6 22.7	*	*
MIL USER VS NONMIL USER	99.6 100.1	19.9 20.8	3.4 3.0	102.4 104.5	.11 .15	22.6 21.4	.96	.04
MIL NON USER VS NONMIL NON-USER	97.5 99.8	20.6 21.6	3.5 4.0	101.3 105.0	.10 .18	22.7 20.9	.76	.32
MIL NON TAKER VS NONMIL NON-TAKER	99.6 93.2	21.0 22.2	4.1 3.2	93.1 96.4	.06 .10	22.2 21.2	.93	.06
MIL VS NONMIL	98.0 97.3	20.5 21.4	3.5 3.2	100.6 101.3	.10 .13	22.6 21.2	.88	.13

* No function could be formed

ANALYSIS OF VARIANCE

This section reports the results of an analysis of variance design used to control for certain independent variables and compares the wages of various combinations of the groups defined in the preceding section. Multiple regression analysis could also have been used. Cohen et al (1975) state that multiple regression is essentially an analysis of variance techniques with added advantages in certain situations. In this project an ANOVA design permits a clearer presentation of the results. Therefore the results of the ANOVA will be presented. In several of the analyses below, a multiple regression approach was also completed to validate the results. The results were almost identical and in every case the relative positions of the various groups were the same. There is no loss in using an ANOVA design, and the benefit of greater clarity is achieved.

The variables used in the ANOVA are described below, these variables are similar to ones used in past studies and all generally have proven significant in explaining variation in wages. Additionally, these variables encompass almost all of the variables used in the studies analyzed earlier with the exception of occupation. Occupational choice will be discussed later.

DEPENDENT VARIABLE

Annual wages was used as the dependent variable. Equations using hourly payrates were tested and since the results were similar these equations are not reported. When different years were studied, throughout the longitudinal period of the analysis, the wage for the particular year in question was used.

INDEPENDENT VARIABLES

Age: This was the age of an individual.

Race: A dummy variable was created. A value of one indicated caucasion.

IQ: This was the intelligence quotient score of an individual.

Marital Status: A dummy variable was created. A value of one indicated the individual was married or separated. A value of zero indicated the individual was single or divorced.

Residence Status: All individuals living in the south were excluded from the sample.

Time in the labor force: This factor was controlled for by the method in which the sample was constructed.

Military and Military Training: The training groups used account for military service and propensity to use vocational training.

In the ANOVA design, available through SPSS, the independent variables are controlled for through a regression procedure and the adjusted covariate scores are then used to determine if group membership makes a significant difference to the

dependent variable, wages. If group membership is significant, a runs test is required to determine which group is significantly different (Hicks, 1973). The results of these tests are reported when appropriate.

When a specific year's wages were used as the dependent variable, the value of the independent variables in that year were also used. For example, in 1966 the dependent variable was 1966 wages and marital status in 1966 was one of the independent variables. In 1968 the dependent variable was 1968 wages and independent variable was the individual's maritial status in 1968.

RESULTS

In a preceding section an example was presented which indicated that veterans who received military training apparently received a wage premium when all non-veterans were considered as one group. The comments following that example suggested that grouping all non-veterans in one group is inappropriate. If this proposition is accepted then the use of a dummy variable in multiple regression is also inappropriate. This is so because regression mathematics treats non-veterans as one group when a dummy variable for veteran status is used. The only appropriate way to use a dummy variable would be to exclude individuals from the sample who were inappropriate in the comparative analysis. For example, when attempting to determine the economic benefit

of military service it may be inappropriate to include non-veterans who could not qualify for military service in the sample.

Using the six training groups previously defined, an ANOVA was performed. The results are shown in Table XIII. 1966 wages across groups indicated the largest premium was attributable to the user of military training. A similar analysis using the 1966 year group and 1972 wages also indicated the largest permium attributable to the MIL USER. A somewhat different conclusion was reached when the entire sample was included and 1972 wages were compared. In this case, as shown in Table XIII, the NONMIL USER received the largest premium. He received $739 more than the MIL USER, and $400 more than the MIL NON-USER. This comparison revealed that the MIL NON-USER received a $339 premium over the MIL USER. The results are somewhat inconsistent but the the important point is that when individuals were grouped according to their propensity to use training there was not consistent evidence of a net wage advantage to the veteran. For the 1966 year group the yearly premium was less than $500 and when the entire sample was considered the non-veteran user received a net premium of $739.

A surprising result was the apparent deficit accruing to the MIL NON-TAKER after controlling for the covariates. A multiple regression analysis of a similar design revealed an insignificant F statistic for the wage difference of this

MIL NON-TAKER group. Therefore implications of this large deficit must be made with caution. (The multiple regression analysis did demonstrate a significant F statistic of <.05 for other training group wage differentials.) With due regard to caution one possible implication of such a large deficit is presented. If previous analysis, suggesting that this group was made up of individuals with few alternative choices of employment, can tentatively be accepted; it appears that a military tour did not increase post-service earnings prospects for the MIL NON-TAKER.

Since there was a possibility that the industry chosen by these individuals might have influenced the results, an analysis similar to the above was conducted which included only the individuals of the sample in the Manufacturing Industry. This industry was chosen because it was the industry most heavily represented among the sample. The sample was reduced to 608 individuals. The results, presented in Table XIV, indicated that in 1972 the largest premium accrued to the NONMIL USER when analyzing either the 1966 year group or the entire sample. Compared to the previous analysis conflicting results were obtained for the military USER and NON-USER. Initially the MIL NON-USER had a slight premium but in 1972 the MIL USER had a wage advantage. It may be that within certain industries the MIL USER earns a premium over the MIL NON-USER. But consistent with previous results, the NONMIL USER received the highest premium and the NONMIL NON-Taker incurred the largest deficit.

TABLE XIII Wage Premium Adjusted for Covariates

YEAR GROUP INCLUDED	WAGES USED	TRAINING GROUPS					
		MIL USER	MIL NON-USER	MIL NON-TAKER	NONMIL USER	NONMIL NON-USER	NONMIL NON-TAKER
1966	1966	681	388	-1002	284	-230	-427
1966	1972	1157	774	-1984	687	-1368	-894
All Prior To 1968	1968	741	82	-460	403	-464	-451
All	1972	122	461	-1640	861	-1049	-677

Notes 1. Raw regression coeffcients and main effects were all significant at <.01

2. The coefficients of the covariates were all in the predicted direction and generally demonstrated the following raw regression coefficents: age, $300; white, #330; additional year of school $140; additonal IQ point score, $29; being married, $1317.

TABLE XIV Wage Premium Adjusted for Covariates
(Manufacturing Industry Only)

Year Group Included	Wages Used	TRAINING GROUPS					
		MIL USER	MIL NON-USER	MIL NON-TAKER	NONMIL USER	NONMIL NON-USER	NONMIL NON-TAKER
1966	1966	-162	132	-1269	246	-453	-123
1966	1972	393	-720	-1836	1525	-509	-1037
Prior 1968	1968	-215	-401	-623	677	-531	-273
All	1972	832	-272	-2488	1699	-956	-939

Notes: 1. Raw regression coefficients and main effects were all significant at <.01

To verify that occupational choice was not confounding the results an ANOVA was performed on all skilled blue-collared workers in the sample. This analysis controlled for all independent variables as was done in the other ANOVAs of this section. The ANOVA performed on the 941 individuals of the sample who were skilled blue-collar workers suggested that occupational choice does not significantly change the overall analysis. It is quite possible that other occupational groups were randomly represented throughout the six training groups. The 1972 wage premiums, adjusted for covariates were as follows:

MIL USER	$ 51
MIL NON-USER	357
MIL NON-TAKER	-2922
NONMIL USER	1047
NONMIL NON-USER	-747
NONMIL NON-TAKER	-587

Since discriminant analysis indicated a close similarity in personal characteristics between the MIL USER and MIL NON-USER groups these groups were combined and an ANOVA was completed. The results presented in Table XV were consistent with all previous analyses. The NONMIL USER received the highest premium after six years of work experience and the MIL NON-TAKER group incurred the largest deficit. It is important to note that the wage differential between the MIL USER and the NONMIL USER was not nearly as large as was the difference between these two groups and the NON-TAKER groups.

TABLE XV Wage Premium Adjusted for Covariates

Year Group Included	Wages Used	TRAINING GROUPS				
		MIL USER and MIL NON-USER	MIL NON-TAKER	NONMIL USER	NONMIL NON-USER	NONMIL NON-TAKER
1966	1966	403	-1001	284	-230	-427
1966	1972	843	-1985	687	-1368	-893
1968 and Prior Years	1968	205	-461	403	-464	-450
All Year Groups	1972	381	-1634	860	-1049	-677

Notes 1. Raw regression coefficients and main effects were all significant at <.01.

To investigate the wage differential between veterans and non-veteran takers of vocational training an ANOVA was completed grouping the MIL USER and MIL NON-USER in one group and the NONMIL USER and NONMIL NON-USER in another group. The results of this analysis are presented in Table XVI. With the NON-TAKERS removed analysis there was no significant difference in wages due to group membership. That is, being a veteran was not a positive factor in explaining wage variation. The covariates all had signficiant F statistics, but the F value for the control group contribution was insignificant in all cases (i.e. F less than .3, with a signficance of $<.55$).

In all of the foregoing analyses, in only two cases did the MIL USER have an advantage over the NONMIL USER in 1972. The first instance was when all non-military individuals were grouped together (as described in Section III). The second case was when the 1966 year group was considered across the six training groups. In all other cases, there appeared to be no premium to military service or military vocational training. When the manufacturing industry was analyzed there appeared to be a premium to the veteran who used training over the veteran who did not, but there was no net advantage to veterans.

The deficit to veterans who did not take military training was apparent in all above analyses. When this group was compared with non-veterans who had not taken vocational

training the following evidence indicated that they were not persuing any activities which might enhance their future wages: In all but one year during the study the veteran non-takers participated in additional schooling at the same or lower rate as the non-veteran non-taker. In 1971 only 78 percent of the MIL NON-TAKERs were employed. The next lowest employment rate was 87 percent for the MIL USERs. An ANOVA analysis, identical to the ones above, indicated that the NONMIL NON-TAKERs who had an IQ below 85 were earning as much as the veteran non-taker. The average IQ of the veteran non-taker was 96.9. This difference may be indicating an earning detriment to service in the military for some categories of individuals.

One final ANOVA was completed separating veterans and non-veterans. All individuals with IQ's less than two standard deviations from the mean were excluded. Since the MIL NON-TAKERs were a smaller segment of the military population in relation to NON-TAKERs in the non-military population, it was hypothesized that there would be no significance attributable to military service. Although there is no absolute minimum IQ level that can be determined for entry into the military, the screening exams would be expected to reject the majority of individuals two standard deviations below the mean. When individuals with an IQ less than 69.9 were counted, this observation was upheld. Of 523 individuals in this category less than 10 percent of these individuals

TABLE XVI Wage Premium Adjusted for Covariates
(Excluding Non-takers of Vocation Training)

YEAR GROUP	WAGES USED	TRAINING GROUP	
		MIL USER AND MIL NON-USER	NONMIL USER AND NONMIL NON-USER
1966	1966	92	-44
1966	1972	272	-128
1968 And Prior Year Groups	1968	-121	46
All Year Groups	1972	-120	63

Notes: 1. Raw regression coefficients were all significant at <.01, but training group contribution had an insignificant f statistic of .3.

were in any military group whereas 81 percent of these individuals were in the non-military subgroups; 18.7 percent in NONMIL USERs, 10.7 percent in NONMIL NON-USERs, and 51.5 in NONMIL NON-TAKER .

The results of this ANOVA on 1972 wages across the military and non-military groups demonstrated no significance associated with group membership. In other words, no premium could be attributed to military service for individuals with IQ's greater than two standard deviations below the mean.

Further evidence suggested that the groupings in this section would be appropriate when comparing the benefits of military service or military vocational training was the socio-economic status of these groups. Listed below are the mean values of the socio-econmic index of the individual's family in 1966:

MIL USER	103.5
MIL NON-USER	100.2
MIL NON-TAKER	90.0
NONMIL USER	102.6
NONMIL NON-USER	94.6
NONMIL NON-TAKER	86.8

SUMMARY

When veterans and non-veterans were compared on the basis of their propensity to use vocational training it appeared that neither military service nor military vocational training had a positive effect on post-service earnings. In fact, there

to be some evidence in the MIL NON-TAKER group that there might be some disadvantage to military service. If all sample members were grouped as veterans and non-veterans, then both ANOVA and multiple regression showed a significant wage premium to membership in the military. But the observations outlined above indicated that this type of comparison is really not appropriate. The most important of these observations was that the non-military subsample included individuals who could not make it through the military screening process. Including these individuals in a comparison is inappropriate. Also, the individuals with no training made up 50 percent of the non-military subgroups, but only 22 percent of the military sub-groups. In most analysis techniques this would tend to bias the results toward the military because they have a larger share of individuals with a propensity to take training.

When the 1966 year group was considered, initial wage premiums were attributable to veteran users of vocational training. This may indicate employers use the military as as screening device to select individuals who have demostrated good work habits by completing military service. But after six years of work experience non-veterans who obtained and used training have had time to demonstrate they are good workers also and earned similar,to slightly higher, wages. In a tight labor market this screening process might eliminate the non-veteran from a specific job opportunity, but this situation is unlikely to have long term effects. That these groups were similar in background characteristics not associated with

the military was evidenced by discriminant analysis results which lead to the tentative conclusion that individuals who want training will obtain it one way or the other.

If the user of military training does not receive benefits from training after six years of work it is hard to imagine premiums later in his work experience history. It is more likely that vocational training's value decays with time. There is a possibility that use of GI benefits in subsequent years will aid the individual but it is important to realize that GI benefits were created by a policy decision to aid those who served in the military. GI benefits are actually payments to an individual that can be used to obtain training in the civilian sector. Financial gain from these benefits are not attributable to general or specific training obtained while an individual is in the military.

Concerning the MIL NON-TAKER, evidence points to the likelihood that this individual experienced poor employment opportunities before enlistment and continued to experience poor alternatives after the service. This appears so even though a small percentage of this group took advantage of civilian vocational training after their service obligation. The possibility that this group would later attend school on the GI bill and subsequently enjoy higher wages was not supported by their behavior.

A definite conclusion that military training or military service is not beneficial is not possible though, because of the different financial considerations concerning military

vocational training and civilian vocational training. The individual who has a propensity to use training but does not have the financial resources to obtain civilian vocational training may benefit from a military tour. This individual could join the service and obtain military vocational training that could be used in later civilian work, or use the various military GI benefits to obtain later civilian training. The "catch-22" problem is that most individuals who have a propensity to use vocational training come from a family with a relatively high socio-economic background which would indicate that financial resources would not be a problem.

The results of this analysis does agree with some past studies. For instance, Norrblum (1976), and Massell et al (1974) concluded that during the first year of work experience the veteran who used military training in civilian employment received a premium over the veteran who did not use such training. This study discovered an identical premium in the first year, but by the sixth year it was observed that the veteran who did not use his military training was earning similar to slightly higher wages. A direct comparison of these studies is slightly misleading though since Norrblum (1976) and Massel et al (1974) considered a user of training as an individual who used training that year. This study's definition of a user was not as specific. Little et al (1979), Knapp (1979), Browning et al (1973), and Lopreato et al (1977) concluded that veterans earn a premium over non-veterans, if non-veterans are considered as one group. This study demonstrated identical

results when grouping non-veterans as one group. But when IQ levels were controlled for or individuals were grouped by their propensity to use training an economic advantage to veterans was not observed. Finally, if members of the military subgroups had not joined the service they would have had, on the average, 20 months more civilian labor force experience. Thus, it appears that among "equal" individuals they may have given up civilian labor force experience for an earnings deficit six years later. This may apply most specifically to the veteran who does not qualify for military vocational training. Without training, job tenure may be relatively more important than to an individual who has propensity to use training and thus gains a wage advantage because of such training.

SAMPLE

Taking another sample from the NLS assisted in confirming the conclusions reached in the last section. The analysis of this section indicated that neither military service nor military vocational training was significant as a factor in post-service earnings. Evidence indicated that the military service variable used in some past studies might be reflecting an individual's general ability level. Evidence was also present which indicated that the value of occupational training depreciates.

The sample of the NLS selected for this section's analysis included all individuals who were in the civilian labor force as of 1971 and had not served in the military prior to 1966. Individuals serving in the military as of 1971 were excluded. Therefore the veterans in the sample would have started military service after 1966 and been discharged prior to 1971. Several multiple regression analyses were completed on this subset in 1969. The changes to the sample for the 1969 regressions consisted of excluding individuals who were not in the civilian labor force in 1969, and excluding those in the military as of 1969. Individuals in the labor force as of 1969, but who dropped out in 1971 included in the 1969 regression but not in the 1971 regressions. Table XVII presents data on the sample for the 1969 and 1971 regressions. As would be expected, the

number of veterans in the sample was greater in 1971. Table XVIII presents general information on the sample by veteran status. It was noted that the veterans were generally better educated (a mean education level of 12.6 for veterans opposed to 12.4 years for non-veterans), and were slightly older. Over 13 percent of the veterans used some civilian obtained training while only 8.6 percent of the non-veterans used some civilian training. This was not surprising since a greater percentage of veterans are required to screen for vocational training and the recruiting theme in the military may attract individuals who want training. A user of vocational training was defined, in this section, as an individual who stated he used the training in the year of analysis.

TABLE XVII Section VI's Sample Characteristics (actual numbers)

CHARACTERISITCS	SAMPLE YEAR	
	1969 Regression	1971 Regression
TOTAL	2076	2121
WHITES	1660	1760
VETERANS	166	488
TOOK MIL TRN	83	244
USE MIL TRN	13	36
MARRIED	884	1251
USE CIV TRN	255	318

TABLE XVIII Characteristics on Veterans and Non-Veterans For Section VI's Sample (percentages)

VARIABLE	VETERANS		NON-VETERANS	
	1969 Sample	1971 Sample	1969 Sample	1971 Sample
PERCENT MARRIED	40	56	51	72
PERCENT WHITE	80	77	70	70
MEAN ED. LEVEL	12.6	12.6	12.1	12.4
PERCENT USE CIV TRN	11.3	13.5	8.1	8.6
MEAN AGE	21.6	22.7	21	22.9

In 1969 and 1971, regression equations were completed on the entire sample and on individuals from the sample whose IQ's were within two standard deviations of the mean. These latter regressions were completed for comparative analysis. The rationale for excluding individuals with IQ's greater than two standard deviations from the mean and comparing the results to the entire sample was to observe the effect of this procedure on the military service variable. A disaggregation of the sample by ability should not effect the coefficients of independent variables if they are actually independent of an individual's ability.

VARIABLES AND EQUATIONS

The dependent variables used in this analysis included hourly payrate, the natural log (LN) of hourly payrate, and reported annual wages. The LN of annual wages was also tested but the results are not reported because the R squared values were under 10 percent. For this group of relatively young workers the annual wage regression equation developed the highest R squared values. In 1969 the R squared values for the annual wage equations were .37 and in 1971 the values were approximately .29.

The coefficients of the independent variables in the payrate and annual wage equations are the dollar value that can be attributed to an additional increment of that variable. The form of the equation is:

$$WAGES = A + BX1 + BX2 + BXN$$

The coefficients of the independent variables in the LN (payrate) equations express a percentage increase in earnings that can be attributed to an additional increment of the variable. The general form of the equation is:

LN (payrate) = A + BX1 + BX2 + BXN.

The independent variables used were similar to those identified from other studies. They included the following:

IQ: This was the intelligence quotient score of an individual.

Age: This was the age of an individual.

Race: A dummy variable was created. A value of one indicated caucasion.

School Completed; the highest level of school completed in 1969 or 1971, depending on the year of the analysis.

Tenure: Number of years with current employers. Total experience in the labor force could not be determined without constructing a variable heavily dependent on grade of school completed and age. Since these two variables were in the equation, a total labor force experience variable was not constructed.

Military: A dummy variable was created. A value of one indicated completion of at least six months of service.

Married: A dummy variable was created. A value of one indicated the individual was married or separated. A value of zero indicated the individual was single or divorced.

Use CIV. TRN: A dummy variable was created. A value of one indicated that the individual reported use of civilian training in the year of anlysis.

Use MIL. TRN: A dummy variable was created. A value of one indicated that the individual reported use of vocational training received in the military on his civilian job. Vocational training was defined as job related training and did not inclue basic military training.

SMSA: A dummy variable was created. A value of one indicated the individual worked in a central city area.

Health: A dummy variable was created. A value of one indicated the individual did not have health problems which effected his work.

Non-South: A dummy variable was created. A variable of one indicated that the individual did not live in the southern region of the U.S.

RESULTS

Military service and military vocational training regression results are presented in Tables XIX and XX. In the payrate equations the coefficients were slightly less than $.01 for some continuous variables, but the overall effect of the variable may be considerable. For example, 10 additional IQ points can mean $.10 in hourly payrate. Similarly, some coefficients in the LN (payrate) equations were less than one percent. Care should be exercised in assessing the effect of the variable based on its significane and the range of the variable.

A problem concerning representation developed in the 1971 sample. The 1971 sample did not include individuals living

in the southern region of the country. The 1969 sample did include individuals in the southern regions of the U.S. Similar coefficients for the major independent variables in both 1969 and 1971 indicate that the conclusions drawn might not be adversely affected by this problem.

The coefficients of the variables in the equation generally conformed to theory and past studies. For these younger workers, increased age was related to increased earnings. Being white and married also were a significant positive influence on earnings. In all but two of the equations education was positive and significant. In the 1969 annual wage regression equations education was not significant and slightly negative. Since the result only occurred in two of 12 equations it was difficult to understand the reason. Good health and living outside the south were positive factors in determining wage variation.

Military service indicated a significant positive contribution to earnings in only four equations. In both the 1969 LN (payrate) equations military service was significant. In the 1969 LN (payrate) equation that included all individuals, the military service coefficient was <.01 percent and was significant at the .05 level. When individuals with IQ's greater than two standard deviations from the mean were excluded, military service was signficant as an explanatory variable at the .10 level. In both the 1971 payrate equations military service was signficant. When all individuals were included the coefficient was $0.16 and the F statistic indicated

TABLE XIX 1969 Regression Results for Sample

VARIABLE	REGRESSIONS					
	1969 Payrate All IQ($)	1969 Payrate IQ-2 S.D. of Mean($)	1969 LN Payrate All IQ (%)	1969 LN Payrate IQ-2 S.D. of Mean(%)	1969 Annual Wage All IQ ($)	1969 Annual Wage IQ-2 S.D. of Mean (%)
IQ	<.01	0	<.01	<.01	.29	1.70
AGE	.14***	.14***	<.01***	<.01***	474***	483***
RACE	.15***	.15***	<.01	<.01	612***	586***
SCHOOL COMPLETED	<.01***	<.01***	<.01***	<.01***	-27	-36
MILITARY	.10	<.01	<.01**	<.01*	-368	-375
MARRIED	.39***	.38***	,16***	.16***	1672***	1639***
USE CIV TRN	.31***	.28***	.12***	.12***	1276***	1244***
USE MIL TRN	-<.01	-.39	-<.01	-<.01	-811	-1298
SMSA	.11***	<.01*	<.01***	<.01***	152	124
HEALTH	.17**	.18**	<.01	<.01	566***	551***
NON SOUTH	.59***	.60***	.20***	.20***	721***	724***
TENURE	.00	.00	.00	.00	.00	.00
F	76.4***	68.7***	43.5***	38.7***	100.9***	93.2***
R	.33	.32	.20	.19	.37	.37
SAMPLE	1742	1642	1901	1795	1882	1777

* Significant at .10

** Significant at .05

*** Significant at .01

TABLE XX 1971 Regression Results for Sample

VARIABLE	REGRESSIONS					
	1971 Payrate All IQ($)	1971 Payrate IQ-2 S.D. of Mean($)	1971 LN Payrate All IQ (%)	1971 LN Payrate IQ-2 S.D. of Mean(%)	1971 Annual Wage All IQ ($)	1971 Annual Wage IQ-2 S.D. of Mean (%)
IQ	< .01***	<.01***	<.01***	<.01***	15***	17***
AGE	.18***	.17***	<.01***	<.01***	470***	464***
RACE	.26***	.26***	<.01	<.01	729***	774***
SCHOOL COMPLETED	< .01***	<.01***	<.01***	<.01***	93***	82***
TENURE	< .01***	<.01***	<.01*	<.01*	183***	182***
MILITARY	.16**	.15*	<.01	<.01	-99	-185
MARRIED	.35***	.35***	.12***	.12***	1752***	1700***
USE CIV TRN	.36***	.39***	.18***	.19***	1517***	1508***
USE MIL TRN	-.27	-.27	-<.01	-<.01	53	95
SMSA	.21***	.18***	<.01***	<.01***	144	157
HEALTH	.30***	.31***	<.01***	<.01***	587***	515*
NON SOUTH	.00	.00	.00	.00	.00	.00
F	60.6***	54.9***	35.4***	31.0***	77.7***	77.0***
R	.25	.25	.14	.13	.29	.28
SAMPLE	1943	1836	2154	2038	2121	2007

* Significant at .10

** Significant at .05

*** Significant at .01

a significance of .05. When individuals with extreme IQ's were excluded the F statistic was less signficant (10), as in the 1969 LN (Payrate) equations.

Use of civilian vocational training was signficant and positive in all 12 equations with a coefficient indicating a premium of approximately $0.38 per hour or $1450 per year.

Use of military training was not significant in any of the 12 equations. Although the veterans in this sample had less than three years civilian experience the majority had more than one year's experience. From the analysis of the last section it is seen that other than a first year premium, use of military training was not generally significant: thus the results were not surprising.

The reduced significance of military service when the sample was disaggregated by IQ indicated there was a possibility that the military service variable was representative of some general ability level not captured in most studies. Veterans must meet certain standards to join the service and the majority of veterans qualify for vocational training which is an additional ability related standard.

Consider the above observations in regard to some past studies on the post-service earnings effects of military service. In Little's et al (1979) study veteran experience was a positive factor in earnings of a sample of WWII veterans. It was noted though, that these veterans generally came from better backgrounds. Griliches (1977) reported that background characteristics correlate to some degree with ability. This may indicate that the veterans in the sample used by Little et al (1977) may have had higher ability. It is very unfortunate

that an ability measure was not available to analyze the effects of this variable on Little's et al results. Cutright's (1974) study, aside from grouping by AFQT level, included only draftees and concluded there was no wage premium to the veteran. It may be that draftees are not representative of the military population. They also may not have received vocational training benefits and this may have contributed to Cutright's (1974) conclusions. If the hypothesis that military service is representative of some ability level is true, a study which analyzed military service as a contributor to post-service earnings would discover different results in periods were entrance standards changed. Thus changing the relative ability of veterans and non-veterans.

Decaying Value of Occupational Training

To investigate whether the value of occupational training may decay with time, equations similar to the ones presented in TABLES XIX and XX were specified with civilian occupational training disaggregated by the timing of the training.

Three hundred eighteen individuals used civilian occupational training in 1971. One hundred and ninety-seven of these individuals had civilian occupational training within the last year while the remainder received their training as indicated in TABLE XXI. Admittedly the majority of the users of civilian training received their training within one year of using it, but since 26.4 percent of these individuals last took

training in 1966. Thus, the value of civilian training over time could be analyzed.

TABLE XXI Timing of Civilian Vocational Training For Users of Training in 1971

Year Civ Vocational Training Taken	Percent of Users	Number of Users
1970-71	62	197
1969-1970	7.5	24
1968-1969	1.9	6
1967-1968	2.2	7
1966-1967	26.4	84
TOTAL	100	318

TABLE XXII presents the regression results when civilian training was disaggregated by timing of civilian training. TABLE XXII presents only the values of the civilian training coefficients. The coefficients of the other variables were almost identical to the ones reported in TABLEs XIX and XX and are not reported again.

The results indicated that for these users benefits were related to the timing of the training. The recent training was significant and more economically beneficial than older

training. The sample, although small, indicates that occupational training decays with time.

A review of studies in the training area did not reveal any past research on the decay of vocational training benefits. If the value does decay with time the implication to military training and its effect on post-service earnings seems clear. Once a veteran leaves the military the value of training decays and the life-cycle addition to earnings occurs only in the early years of civilian work experience. Additionally, it indicates that a comparison between civilian and military vocational training is difficult because civilian vocational training can be replenished by taking more but "military" vocational training cannot be replenished once the individual is out of the military.

TABLE XXII Regression Coefficients For Use Of Civilian Training Disaggregated by Timing of Civilian Training

TIMING OF CIVILIAN VOCATIONAL TRAINING	REGRESSIONS		
	1971 Payrate (dollars)	1971 Wage (dollars)	1971 LN (payrate) (percentage)
1970-1971	.43***	1985***	.19***
1969-1970	.23	1393	.22
1968-1969	.64	890	.11
1967-1968	.53	1652	.26
1966-1967	.23*	492	.12**
R squared	.25	.29	.14

* Significant at the .10 level

** Significant at the .05 level

*** Significant at the .01 level

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The conclusions presented in this section are based on a study of the first six years of civilian work experience of two subgroups of the NLS. Before the conclusions are presented several areas are addressed which may have influenced the results of this study. Some past studies (Little et al, 1979; Fredland et al, 1980) have suggested that a longer period of time is necessary to analyze possible economic benefits to military training or military service. It may be that it takes more than six years for the benefits of a military tour to be reflected in post-service earnings. Another area that may be important but was not considered in this study is the value of military vocational training to the individual who stays in the military. The present value of military pay over a career has risen because of pay increases in the 1970's. If military vocational training helps an individual advance in a second career, the value of military vocational training may be substantial. A third factor which may have influenced the study's conclusions is the transferability of vocational training. Civilian vocational training prepares an individual for a specific civilian job and should be 100 percent transferable to the civilian labor market. Military vocational training, on the other hand, may not be 100 percent transferable. The conclusions of this study which follow, should be viewed in light of these comments.

When individuals were compared by their propensity to use training neither military service nor military vocational training appeared to have a consistently significant impact on post-service earnings. Veterans and non-veterans who had a propensity to use training could not be distinguished based on personal characteristics. This indicates that the military has little influence on the propenisty to use vocational training. Additionally, when individuals were spearated by IQ the military service variable demonstrated less significance as a factor in wage variance determination.

An indication that veterans who do not take vocational training suffer a post-service earnings loss over comparable non-veterans was present but the sample size was too small to draw strong inference beyond that group. If future evidence confirms this proposition it means that the individual, who has a low propensity to take vocational training is giving up civilian job tenure which is relatively important to this individual's future earnings.

Veterans and non-veterans with a propensity to take vocational training have similar personal characteristics which suggests that the taking and use of training is not influenced by a military tour. It appears the initial motivation to take training is inherent in an individual's personal characteristics.

The finding that non-veteran NON-TAKERs of vocational training increased their educational levels over the years

indicates that, during an expanding economy, more highly educated individuals opt for employment without a prior investment in vocational training. Apparently more highly educated individuals have had appealing employment prospects and these prospects have overriden a decision to take vocational training.

Vocational training is important as evidenced by the finding that use of civilian vocational training was beneficial to individuals in this sample; the more recent training was the most beneficial. Military vocational training was also beneficial to an individual during the first years of work experience. But after a few years of civilian experience military vocational training no longer demonstrated significance as a factor in determining wage variation. Wage and productivity changes seem to be effected less by training as the training ages.

The hypothesis that employers use the military as a hiring screen for the first job was supported in this study. The premium attributable to this screen apparently dissipated with length of time from initial employment.

Finally, it is possible that military service, as a variable in human capital studies, has been representative of some measure of ability. This conclusion is supported by evidence that suggested military service lost its significance in explaining wage variation when individuals were grouped by IQ. This result was found initially be Cutright (1974) and was observed in this study.

RECOMMENDATIONS

Based on this study's conclusions several implications to policy decisions are apparent. Concluding that there is no economic benefit to military service in post-service earnings means that the rewards to a military tour are less than otherwise thought. Therefore it is important to review the wages and benefit package for military service. A package that provides increased wages may be necessary to attract individuals who are opting for employment now rather than some kind of vocational training. Also, a package that provides civilian vocational training in post-service years would help attract the current non-veteran who has a propensity to use vocational training. The benefits of post-service civilian vocational training could be easily proven and then the connection between military service and post-service vocational benefits could be advertised. Although some GI benefits now allow such civilian training, advertising to explain this connection is not used.

Second, the military advertising theme should be partially redirected to help attract individuals who are joining the job market now because of a low internal rate of time preference for future earnings. Even without increased wages, advertising which fully explained the monetary value of the current military wages and benefit package would raise the perceived salary for military service at least in the eyes

of a large portion of young citizens. This perceived pay raise would help attract those individuals who are more concerned with current wages than an investment in training. Evidence from this study indicated that there may be a large pool of individuals who are making employment decisions based on wages in lieu of opportunities for training.

Third, association with an institution merely to develop work habits does not appear to enhance earnings. This statement is supported by the observation that veterans who did not take vocational training were also the individuals who suffered the largest wage deficits. Disadvantaged youth who could not qualify for military vocational training would probably suffer a future wage loss rather than be helped by a military tour.

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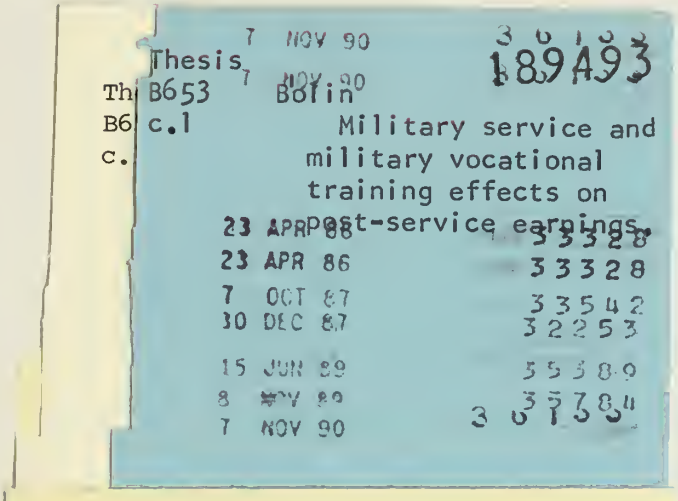
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